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EXTRACTS FROM REPORTS ON
LARGER FIRES OF 1939
IN
WESTERN REGIONS

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MORE LESSONS FROM LARGER FIRES OF 1939 TAKEN FROM REPORTS ON FIRES OF OVER 300 ACRES

Edited by ROY HEADLEY

Division of Fire Control, U. S. Forest Service, Washington, D. C.

As shown on page 6 of the July 1939 issue of Fire Control Notes, the number of National Forest Fires of over 300 acres in 1936, 1937, and 1938 was 105, 62, and 73, respectively. But although 1939 hardly ranks with the seven outstanding bad fire years since the creation of the National Forests, the number of fires of over 300 acres jumped from 73 in 1938 to 160 in the preliminary reports for 1939. A group of National Forest officers and fire research men meets in February to give special consideration to problems of such larger fires. Every effort will be made to identify the more important problems needing attention and to plan tests, studies, and experiments which should contribute to their solution. This series of lessons learned by men most directly associated with the larger fires of 1939 has been provided for use at that meeting. As heretofore, the publication of a "lesson learned" does not necessarily mean that the editor agrees with the author's deductions from his experience.

Searching study of experience on larger fires is the most direct way of learning how better to handle potentially large fires in the future. Errors of judgment are almost inevitable. No one should fear criticism or discipline for his best judgments which prove to be wrong. What he should fear is failure to identify errors and to help search for ways of avoiding them in the future.

Good work in keeping fires from reaching 300 acres or in keeping large fires from getting larger, gets little emphasis in these "lessons learned." That is unfortunate. It is just as important to recognize new or better things as it is to recognize errors. Readers are invited to supply instances of good work. Good work for this purpose means new or better ways of sizing up burning conditions, foreseeing changes in fire behavior, organizing and managing men and machines, locating line, training for actual or potential larger fires, line holding, backfiring, dealing with spot fires, executing team plays in critical situations, getting high output of held-line per man hour, and all the other arts which contribute to success in dealing with larger fires or those that threaten to attain that prominence. We should try to give at least the reward of recognition for creative thinking to men who forge ahead along these lines.

California Region

Sierra—Source Point Fire—16,896 acres.—(This was from a campfire of a local Indian on a brush-grass slope of 50 percent on July 19. Guessed origin was at 11:30 a. m., in a 20-mile wind which rose to 40 miles during the fire's biggest run. Fire was discovered in 4 minutes at 400 square feet; when reached 31 minutes after discovery and by 17 miles auto travel, the area was 100 acres. When corralled 7 days later, it had burned over 61 million feet of merchantable timber. Total estimated damage to timber and young growth, \$265,482. Output of held line per man was .07 chain. About 10 miles of line were lost out of a total of 49 miles constructed. Maximum number of men engaged, 21 Forest officers and 860 others. Report does not say what prevention effort had been directed toward local Indians. Offender in this case not caught.—Ed.)

I do not think that any prevention policy could have prevented this fire since the area where the fire started is used only by a few Indians on fishing trips at that time of the year.

The San Joaquin River canyon is for the most part a blind area, and the fire had a good start before being picked up by the Southern California Edison Company employees. A lookout station on Musick Peak would overlook this area and has been proposed for some time, but because of lack of funds has not been constructed. Fire would have been picked up by a Musick Peak lookout when very small.

Night work for the first three nights was hampered by lack of flashlights, there being not more than one light for three men. In the future, an adequate number of lights and batteries should be supplied with fire tools in all camps so that all crews going to a fire will be equipped for either day or night shifts. These were not available because of a change in type.

On the initial attack in the Chewanakee area, line was built too close to the fire and the night down draft kept putting fire over the line.

We should have recognized when fire broke on the 20th that we were in for bad fire weather and, since the territory is very rough and bluffy, called for more overhead and fresh men.

Aerial photographs and scouts should have been available so that plans could have been made for line to be built and backfired well in advance of the runs of the 21st and 22nd.

The camp established in the Daulton area on the 24th should have been set up 24 hours earlier.

Tractors used on the line the night of the 24th and day of the 25th were a big factor in rapid line construction, and it was a result of their use that lines were held where they were. Tractors should be dispatched to all fires that have a possibility of becoming big fires. When the camp in the Daulton area was set up, fresh men should have been brought in instead of using men that had been on the fire the 3 previous days.—E. G. Westfall, *district ranger*.

I found out on this fire the value of written orders.

Quite often we think we haven't time to write orders, when in reality time is saved in the long run; carbon copies can be made which can be used for camp record and future reference.

In one instance when written orders were not given, crews were doing a mop-up job on one sector when they should have been building fire lines and backfiring farther out. Quite fortunately no line was lost.—E. G. Madsen, *district ranger*.

Forest officers estimate that some 400 deer (bucks and does), and 200 fawns lost their lives in this fire which occurred within the boundaries of the Huntington Lake Game Refuge in Fresno County. This was one of the best breeding grounds on the Forest and the fire destroyed the winter feed for at least 1,500 deer which ordinarily inhabit this range during the winter months. If a heavy winter is experienced in 1939-40, many of these deer will be forced by starvation into the already overgrazed foothill country. In addition to the deer killed, thousands of the smaller denizens of this rugged canyon country—rabbits, squirrels, chipmunks, and birds—also lost their lives.—F. P. Green, Sierra.

Sierra—Quartz Mountain Fire—30,215 acres but only 830 acres inside.—(Indians using dynamite caused this fire which started outside

while the Sierra force was busy on the Source Point Fire. The State apprehended the men causing the fire.—Ed.)

Considerable effort was spent on this fire in trying to stop the head when flanking should have been resorted to. Direct attack was tried when the crew should have backed up to an existing road.

Scouting should be done by someone who is familiar with the country as misinformation is dangerous.—E. G. Madsen, *district ranger*.

Cleveland—Cameron Valley Fire—820 acres.—(Was in blind area and $\frac{1}{2}$ acre when discovered; 1 acre when reached by tanker and 3 men 14 minutes after known time of origin and 7 minutes after discovery. Second tanker with 4 men followed very closely. Shows that low hour control and tankers are not a cure-all. Both tankers became vapor locked, but report does not say how soon this occurred after arrival. It is felt that this mechanical failure lost the fire. Fire started a run on arrival of first crew and ran until sunset.—Ed.)

Mobile radio sets in the tankers, enabling the first attack crews to communicate directly with the dispatcher, would probably have made it possible to secure more effective follow-up action on this fire. However, full use was not made of available radio equipment to keep the dispatcher currently informed of manpower needs. A good many of the Cleveland fires occur under topographical conditions similar to those of this fire and the numerous roads enable the fire boss to move trucks and equipment to all sides by means of roads. Under such conditions, mobile radio equipment would pay for itself within a short time through its value to the fire boss in the rapid shifting of equipment to those sectors of the fire that are in greatest need of attention.

Probably one of the most serious failures in our fire organization is in the gap that exists between the fire and the dispatcher. Field men on the fire line have not set up the proper communication network to get essential information back to the dispatcher. Lookouts have also fallen down in their job of keeping the dispatcher currently informed with reliable estimates of current progress of the fire. All too often we do not know that a fire is dangerous until after it has made a good run; then it takes considerable time to bring in reinforcements.—A. M. Longacre, *acting supervisor*.

Inyo—Grasshopper Fire—1090 acres.—(Illustrates how fires attain size when occurring in areas which usually give little trouble and organization is not fully trained and keyed up. Although directly visible from one and indirectly visible from two points, this hang-over lightning fire was not discovered for 46 hours after guessed origin. The first two men did not know of recent installation of a telephone 1 mile from fire, from which they could have called for help. Because of drift smoke, lookout men could not see and report what was happening.—Ed.)

Summary of reasons for 1,090-acre fire: (1) Inaccessibility and lack of men and transportation. (2) Lack of a fully experienced guard who knew of all facilities at hand and could make early use of them. (3) Failure of guard to realize seriousness of situation, emergency weather conditions, etc. (4) A lightning fire in an area of little human occupancy; recurrence of a similar situation not likely to happen in near future.

Lesson to be learned by district ranger: More intensive pre-season training of guard personnel needed in (a) knowledge of country and

facilities available, (b) imaginary situations similar to this in which the district ranger should attempt to advise the guard and instruct him how to recognize emergency conditions and about the action to be taken.—Roy Boothe, *forest supervisor*.

Klamath—Lockhart Fire—2,000 acres.—(A smoker fire starting in grass; a 20-mile wind blowing during biggest run. Discovered 5 minutes after guessed origin at 10 square feet and reached 2 minutes later at 100 square feet by a miner and two other men. But the fire went to 2,000 acres before it was corralled 44 hours later with a maximum of 310 men engaged. Report does not show whether the cooperating miners making initial attack worked effectively or had had any instruction in prevention of smoker fires or fire fighting. It implies that an attempt was made to confine the fire to too small an area—small-fire methods on a large fire.—Ed.)

Klamath—Cutoff Road Fire—1,045 acres.—(An incendiary fire in slash with 3 sets.—Ed.)

Recognition of a sudden change in wind which headed the fire down hill would have saved approximately 300 acres.

There was an incendiary outbreak in this same area approximately 1 month earlier. Had we put on an emergency patrolman for the balance of the season to stay with these people, it is doubtful whether this second outbreak would have occurred. \$600 spent in prevention would have avoided costs and damages amounting to more than \$14,000.—A. L. Parker, *district ranger*.

Mendocino—Enterprize Fire—1,277 acres.—An alternate plan of attack for changed weather conditions should be considered and discussed ahead of time, especially with respect to night crews. This point was brought out forcibly during a review of this fire and the necessity of making such possible change of strategy a part of the planning work was stressed. Sector and division bosses on night crews should be given necessary instructions especially. It is felt that control of this fire was delayed because of failure to recognize the need of prepared plans for alternate attack.—Frank Price, *forest supervisor*.

Mendocino—Fouts Springs Fire—3,160 acres.—(Fire started from burning of an old building at an old resort. Apparently the resort had no pressure water system, portable pumper, or firebreaks. Fire corralled and all apparently cold 17 hours after origin. Two hours later, a fire started about 20 feet outside of the control line near an old barn. Before tanker could get fire knocked down, roof of barn caught fire, scattering fire into grass and brush in spite of tanker and 25 men. Strong wind caused fire to spread faster than men could control. Fire corralled for second time 6½ days later. A 10-mile wind was blowing at time of biggest run. Considerable trouble occurred on account of men and tractors getting lost. Seems there should be a number of worth while lessons to be distilled from such an experience.—Ed.)

Night crews should be placed in charge of men familiar with the country. This applies to sector and division bosses particularly.

Trail builder operators on night shift should be accompanied by a local man thoroughly familiar with the fire area. Neglect in establishing a side camp caused unnecessary walking by fire fighters.

Considerable time and acreage was lost on this fire because of failure to observe the just indicated factors.—Frank Price, *forest supervisor*.

Modoc—Crane Creek Fire—2,192 acres.—(A smoker fire starting in slash and with moderate wind at origin and at time of biggest run;—328 acres of burned area had been replanted at \$5 per acre. Discovery time was 42 minutes from a point commanding direct visibility. Fire covered 100 square feet when discovered; 2 acres when reached 28 minutes after discovery. Corral time totaled 43 hours. An unexpected east wind was given as reason for the extra-period fire. Out of 16 miles of line constructed, $1\frac{1}{2}$ miles of line were lost. Output of held line per man hour, .035 chains—below the .06 to .16 in which output per man hour falls with such frequency.—Ed.)

Our largest fire of the year brings home many lessons, most of them old ones. Initial action by the Forest Service appears slow. Tools were insufficient in number during the earlier stages of the fire. The ranger in charge seemed doubtful about the extent of his authority in suppressing timber-sale fires. Scouting was poor. Probabilities were not calculated properly. Working units were not coordinated in the earlier part of the fire. Too much effort was spent on the north line, and too little on the south line. Complete records of manpower and costs seemed confusing. Poor equipment was delivered from the rental shops. Lack of heavy transportation facilities prevented us from renting local bulldozers. From this fire the following items are brought to attention:

1. The fire boss, through scouting, ample communication facilities, and personal observations, must at all times have a general picture of the fire boundaries and the distribution of manpower and equipment.

2. Through existing weather conditions and local weather forecasts, coupled with the existing fire area and surrounding cover, the fire boss must calculate all probabilities and act accordingly.

3. Equipment, rental or otherwise, should never be sent to any fire unless it is in good mechanical condition.

4. If a heavy truck can transport available local tractors to fire sooner than we can get them from the rental shop, the heavy truck should be provided.

5. The fire boss must know the extent of his authority *before* the fire season gets under way.

6. Complete accurate records are very essential. Each camp boss must have written records of all transactions.—Unsigned Forest report.

(Perhaps such critical analysis will hasten the day when the unknown reporter will have the pleasure of reporting noteworthy new achievements in the art of fighting larger fires or in keeping fires from getting to the larger-fire class.—Ed.)

Modoc—Bald Mountain Fire—740 acres.—(Although not directly visible from any lookout station, this lightning fire was .1 acre when discovered and .75 acre when reached by 3 men 37 minutes after discovery. First ignition was in a snag. Ground cover consisted of needles, brush, and grass. Wind moderate. Surface fire at arrival, but crowned subsequently. Output of held line, 1 chain per man. One-fourth mile of line lost out of $7\frac{1}{2}$ miles constructed.—Ed.)

This should have been a Class A fire. Through failure of our guards in slow discovery, poor dispatching, and poor initial action, the fire became a major one. The following mistakes are noted:

1. The fire was not seen by the closest lookout until he was requested to look.

2. The dispatcher used cross shots that were almost parallel. He had a much better angle from a third lookout. The dispatcher's map didn't show the road where the fire was located, resulting in poor instructions to the guard, and delayed initial action.

3. The first two control lines were too close to the fire.

4. The district ranger was out of communication for several hours, and knew nothing of this fire until late in the day.

From these errors, we believe the following items need concentrated study:

1. Our guards need more thorough training in their jobs. New guards, in particular, must have a certain amount of instruction given them right on the ground. The guard training school is only a basis. New guards should be given a great deal of experienced aid in suppression, presuppression, and prevention.

2. Older guards should be given as much experience as possible either on their own district or Forest, or on other districts and Forests.

3. All fire-control maps must be kept up-to-date.

4. The dispatcher should avoid parallel shots from his lookouts if at all possible.

5. The district ranger should keep in communication, particularly following lightning concentrations and during periods of high danger. A schedule could be worked out for use of radio and telephone at regular intervals.—From an unsigned Forest report. (Wonder if management of fire control is relatively weak on Modoc, or power for analysis of experience relatively good.—Ed.)

Modoc—Sand Butte Fire—1,130 acres.—(Started by railroad construction driver smoking. Fine of \$100 paid. Discovered at 2 square feet by section foreman who arrived in 5 minutes after known origin. Fire then covered 200 square feet. Section foreman and his men were some distance from their shovels when fire was discovered. Notwithstanding arrival 5 minutes after origin, the delay in getting tools was such that when they got to the fire they were unable to check it. They started work immediately on the north side of the fire and stopped the run in that direction.—Ed.)

This fire, starting shortly after 3 p.m., proved one of our most rapidly spreading fires, burning 1,100 acres in approximately 8 hours. Light to gentle winds were favorable. Relative humidity dropped below 10 on a nearby mountain. Action on this fire was generally excellent, particularly the use of tractors. (Why then only $\frac{1}{2}$ chain of held line per man hour?—Ed.)

Probably only two lessens can be learned from this fire. Quoting the report from the Board of Fire Review: "When Ranger Smith arrived on the Lava Beds Road and had available one suppression crew comprising 14 men, why didn't he gamble on a back-fire along the road to stop the head of the fire? Not being on the ground, we cannot say if this would have been successful. He claimed it would not have been worth trying. Nevertheless, there is a fundamental principle of fire-suppression technique involved, which is that where there isn't anything to lose, play the last ace in the hole to stop the fire. If it is successful, the winnings are great; if a failure, nothing is lost. The old saying—nothing ventured, nothing gained—applies.

"The other lesson brought out concerns the active cooperation of

lumber companies operating nearby or within the Forest boundaries. In this case, with a large fire rapidly burning in the general direction of the company's sawmill, box factory and townsite, the entire population needed little persuasion to turn out and help suppress the fire. We should strive for similar cooperation in fire-suppression action on nearby fires even though they do not threaten the homes and mills of our many forest users."—From an unsigned Forest report.

Can't understand why this reporter and analyst doesn't sign his name.—Ed.)

Modoc—Mud Spring Fire—587 acres.—On this fire the McCloud River Lumber Company failed to get men out on the line as soon as would normally be expected. When the men arrived, there was a lack of available tools. Because this was an operation fire, the Forest Service acted in an advisory capacity. Since this fire, the McCloud Company has created a special fire warden job, placing a capable man in charge of presuppression and fire-suppression activity on their operating areas.

It seems that there is room for improvement in Company action on Company fires. We should, through intelligent constructive criticism, strive to get faster Company action on this and other types of fires.—Unsigned Forest report.

Mono—Dry Lake Fire—640 acres.—(A hang-over lightning fire on an east-side Forest having no lookout stations. Discovered 7 days after guessed origin at 2 acres. 5 acres when reached $1\frac{1}{4}$ hours after discovery. Crown fire on arrival and subsequently. First ignition in a snag. Ground cover: needles and litter. Wind, strong. Two hundred acres of protection forest, 100 acres merchantable forest, and 190 acres young growth burned. Total damage \$2,265. Cost of suppression \$5,494. Illustrates the problem of low-danger east-side Forests where losses do occur but not in sufficient amount to justify organization of fire-control forces as on high-danger forests. But losses tend to increase because of accumulation of fuel from control of grazing and growth of reproduction. When losses, plus cost of suppression, tend to rise on such Forests, they need to be watched closely to see whether a smaller total might result from more presuppression expenditures.—Ed.)

The most important lesson learned from this fire was our lack of equipment and trained personnel to handle such emergencies on this Forest. While the "east side" is relatively low in fire danger, the high winds that occur can cause a terrific rate of spread.

Airplanes proved extremely valuable in transporting skilled overhead from neighboring Forests and making a reconnaissance of the fire.—D. M. Traugh, *forest supervisor*.

Plumas—Bee Fire—3,633 acres.—(Fire covered 100 square feet when discovered 4 minutes after known origin; 10 acres when reached by 9 men 19 minutes after discovery; 12 miles traveled by truck. Wind strong at time of ignition and during biggest run. Crowning on arrival and subsequently. Relative humidity 28. Fuel moisture 5.5 percent. Output of held line 0.1 chain. Out of $9\frac{1}{2}$ miles constructed $\frac{3}{4}$ mile line was lost. Over 6 million feet merchantable timber burned. Total damage \$39,358.—Ed.)

The fire escaped on the second day on that part of the line between the Beardsley Road and Peters Creek. During the first night this part of the line had been considered as not so very difficult or dangerous.

Two crews had been started building lines, one from each end, with instructions to connect through to each other. There was no division boss over this part of the line and no scouting done during the first night. The two crews did not connect. Needed clean burning was not done. On the second day the day crew, sufficient in number to complete the line quickly, took up line construction. They were under a division boss and a scout went through this part of the line during the forenoon. A spot fire, outside the line was the starting point for the fire to spread, but without this, it was considered problematical if the line could have been held.—From unsigned Board of Review report.

A hang-over spot fire broke out and there were seven men and two leaders on the job right now. Line was put around spot. It then crowned and went for a run.—H. F. Wilcox, *district ranger*.

Detection and initial attack were very prompt as was the action in follow-up. A review of the fire brought out that the suppression action of the initial attack forces was of the best, and that the fire was just so hot and traveling so fast that it was impossible to head it until it had made its afternoon run.

The fire was corralled early the next morning, but escaped the second afternoon. The break occurred on a section of line where poor line location and construction resulted from not having a division boss assigned to the division during the first night.

The cause of the fire was attributed to a beekeeper who was smoking beehives at the point and time of origin of the fire. Although this man was taken before a justice court, no conviction was obtained on the case.

(The beekeeper demonstrated in court the improbability that a fire could be started by his bee-smoking equipment and won his dismissal. The question was raised as to whether it would not have been possible to gain a conviction if the beekeeper had been charged merely with responsibility for starting the fire, instead of charging that he started the fire with a beehive smoking device.—Ed.)

Two important points of weakness were apparent in the case of this fire.

1. The failure to recognize earlier a prevention opportunity, the following up of which probably would have precluded the chance of the fire starting at all.

2. Failure to recognize a basic principle of organization in not assigning all sectors of the fire line to responsible division or sector bosses, which failure was responsible for the loss of the fire the second day.

The first point brings out the necessity of detecting all possible fire causing agencies, inside and adjacent to the Forest, and removing them as such through contacts, education of the operators, or imposition of regulations or laws.

In the case of the second point of weakness, our only thought is that more intensified training and specific instruction of our men in overhead positions in the accepted fundamental principles of fire-suppression organization are needed. (But let's be sure we get really fundamental principles for use in our training.—Ed.) A suggestion advanced during the review of this fire was that pocket-sized reminder cards be made available upon which would be listed the duties and responsibilities of men in overhead positions, such as crew boss, sector and division

boss, and fire boss. The thought is that the men in these positions could carry the cards in their pockets on the fire and thus have them available for reference when really needed.

Aside from the two points of weakness indicated, the fire was handled in a very admirable manner.—Keith MacDonald, *chief fire dispatcher*.

(But how about the .1 chain output of held line per man hour? After making full allowance for spot fires, trouble in line holding, etc., is .1 of a chain per man hour all we should expect in this type of country?—Ed.)

Stanislaus—Camp 9 Fire—497 acres.—(A tough break. The National Forest got through with no other fires over 300 acres, and this one came from a spot blown across a river from a State fire. Started in grass on a 40 percent slope. District Ranger Spargo, with 10 men, was nearby expecting such trouble. Elapsed time from known origin to first attack is given as 3 minutes, but the 11 men did not find it possible to stop the spot.—Ed.)

This fire had no special significance. It was held to 483 acres inside the Forest. The fire camp ran smoothly and the control lines went in quickly, considering the fire was on a very steep river slope. (Output of held line per man hour was .2 chain, which is at least above the usual .06 to .16 chain bracket.—Ed.) Adequate patrol prevented slopers, and after the control lines were once in, no trouble developed.

This fire was reviewed locally at our last ranger meeting on December 7, and one point brought out was that in the future with fires of this size, we will immediately take over the kitchen and put in our own hired cooks.—H. P. Struble, *acting forest supervisor*.

Tahoe—Turkey Hill Fire—600 acres.—(A hang-over lightning fire discovered at 300 square feet, 7 days after guessed origin.—Ed.)

The most important lesson from this fire is the importance of searching thoroughly for fires after one or more have been reported from severe lightning storms. This will tend to eliminate hold-over fires such as this, which often cause the most trouble.

A second lesson is the necessity for sufficient aid in properly scouting a fire, such as this, in decidedly rough country just as soon as it is realized that the fire is going to get beyond the control of the attacking force which is immediately available. This will give the fire boss a clearer picture of the entire situation and aid in properly placing crews as they arrive later. (But scouting, like other useful things, can be overdone. What percent of the information produced by scouts is really used? Also there are questions about the usual attempt to place numerous crews around a fire as against the attempt to get more speed in line construction from fewer crews working from one or a very few "anchor points."—Ed.)

The third lesson is that the orders of the individual responsible for the suppression of the fire should not be questioned or disregarded, but should be carried out as quickly as possible. Had this been done in this particular case, the fire would have been but another "B" fire.—Charles C. Beardsley, *district ranger*.

Tahoe—P-14 Fire—670 acres.—(Cause unknown but spontaneous combustion in oil-soaked floor and debris of an old mill building suspected. Building fire scattered spots over a wide area. Area between spots would not burn clean except in strong wind.—Ed.)

Do not cover any more debris with the bulldozers than necessary for the corral of the fire, unless the material gives promise of not burning out from under the cover at a future date. Place competent men of sector or crew boss grade in charge of each bulldozer to properly direct its operator.

It might be well to advocate frequent inspection of buildings being wrecked after long periods of use because the wrecking process reveals fire-causing agencies not previously visible. (What about more attention through prevention plans to the removal or fire-proofing of old buildings.—Ed.)

There was not enough manpower to corral all the spot fires before fresh to strong winds blew the following day, causing inside unburned material to spot over exterior control lines:—H. I. Snider, *district ranger*.

Klamath—Shiltos Creek Fire—800 acres.—A couple of pieces of line were lost on this fire in attempting to corral it at too small an acreage, and it finally had to be controlled where the line should have been put first.

It does not pay to attempt to save a few acres of burned area at the expense of losing lines.—W. C. Meyer, *district ranger*. (This seems to be a major lesson which was learned or should have been learned on a number of 1939 fires, including the very worst ones. In fact, it has been learned over and over for the last 30 years—or has it? Would more attention to the specific but complex art of line location help?—Ed.)

Klamath—Shadow Creek Fire—960 acres.—High winds in an exceptionally steep brush type made this fire difficult to control. Manpower was insufficient the first night of the fire to complete lines.

On the second day, heavy winds came up, spotting the fire over the line for a lot of additional acreage. It was a late season fire and the crew on duty would have had no trouble holding it if the high winds had not come up. But if an additional 25 men had been in camp for use the second day, we probably could have held the lines.

This fire illustrates the necessity of having enough men on the line to catch the spots during the burning period after control lines have been completed.—W. C. Meyer, *district ranger*.

Los Padres—Machesna Fire—26,565 acres.—(Discovered at $\frac{1}{5}$ acre in a blind area 45 minutes after guessed origin, this smoker-hunter fire was reached by two men 2 minutes after discovery while it was still a surface fire of $\frac{1}{4}$ acre. These two men were hunters and had only a wet piece of canvas to work with. When four Forest Service men with a tanker arrived 48 minutes later, the fire had reached 25 acres and was burning rapidly uphill.—Ed.)

This was a preventable man-caused fire. An increased number of patrolmen would have made it possible to contact forest users. As camping is restricted to improved campgrounds, a caretaker in this camp would no doubt have prevented this fire or suppressed it while small and would have cost very little compared to the cost of this fire.

The proposed change to a winter hunting season will do much to eliminate this ever-increasing class of hunter-fires from occurring during the most hazardous time of the fire season.

We are handicapped by not having qualified men to conduct backfiring work. This has been a result largely of rapid turnover in per-

sonnel as well as lack of experience. We intend to include this in our guard training course in the future.

While tractors were used to good advantage on this fire we see a definite need for more tractor units strategically located which are more mobile than today. We should be so equipped as to reach all areas on which tractors can be used within 4 to 6 hours.—William S. Brown, *acting forest supervisor*.

Los Padres—Branch Canyon Fire—3,600 acres.—(You do not often see so many zeros as there are in the elapsed time columns for this fire. A rancher welding on ground bearing grass and stubble started the fire, saw it instantly at 2 square feet, and attacked it at once during a 5-mile wind. But for unexplained reasons he failed to get his fire. Perhaps he could not have done so. If so, the lesson is that even zeros in the elapsed time columns have their limitations. When the zeros won't work, prevention and training is the only alternative.—Ed.)

Los Padres—Cerro Alto Ridge No. 1 Fire—5,860 acres.—(Discovered at 9:31 p.m. Individual men and crews hunted all night and until after 8 the next morning before finding the fire. Dense chaparral and few trails. The mystery is still unsolved as to how the fire was started in such a place. It is classified as a smoker fire but some evidence suggests incendiарism.—Ed.)

Lack of radio equipment for the suppression crew and the lookout man prevented the crew from finding the fire until too late. If the crew had been in communication with the lookout man, they could have been directed to the fire by using a flashlight to indicate their location to the lookout.—Neil L. Perkins, *acting forest supervisor*.

Los Padres—Buck Creek Fire—1,400 acres.—A tractor trail builder was used to rough out a route over which tractors could pass through a barrier of steep country. This tractor-way opens up a large area on which tractor trail builders can be used in the future.

This fire brought out the necessity of backing up far enough away from the fire to permit the construction of secondary lines while the initial attack was going on. If the initial attack failed, the secondary lines were so located and advanced that time permitted the completion and final control of the fire with reduced area and cost. (Presumably this is advocated only when it can be done in addition to the fullest strength in the initial attack.—Ed.)

Use of airplane cargo ships should be limited to dropping initial supplies. Where it is possible to service crews by pack stock this should be done as soon as possible in order to reduce excessive costs. (But use of pack stock when available, does not always reduce costs. More research is needed to find the principles which should apply on this point.—Ed.)—Neil L. Perkins, *acting forest supervisor*.

Los Padres—Bald Mountain Fire—1,480 acres.—(Discovered instantly, this lightning fire was reached at 1,000 acres after 5 hours and 40 minutes travel time; 53 miles by truck and 5½ miles on foot.—Ed.)

The lack of an adequate trail system prevented rapid travel time to this fire which accounts largely for its large area.

CCC manpower was not very effective on this fire because of the 72-hour regulation in effect in this CCC district. Some of the crews had been on other fires and on standby during this electrical storm, and it was necessary to replace them soon after they reached the fire. This

72-hour regulation is apparently not true of all CCC district headquarters and should be removed before next season.—Neil L. Perkins, *acting forest supervisor*.

Shasta—Dwinell Fire—3,406 acres.—One of 38 fires caused by this particular storm. The lightning began to strike early in the morning and continued throughout the day and night. Fire was discovered one minute after the lightning bolt struck.

All regular fire crews on the district were already out on fires at the time this one broke. In addition, several replacement crews had been organized and sent to going fires. (Report time for this fire is given as 1 hour and 1 minute.—Ed.)

Showers of short duration occurred off and on all night. This made backfiring a slow poor job. The material on the ground burned only with a great deal of attention. The tops of the brush failed to ignite after the initial heat had diminished. Backfiring was completed as best possible by 4 a.m.

The $\frac{1}{2}$ chain per man hour for all work done on the 1,115 chains actually built, includes tractor work on 965 chains at the rate of 13 chains per man hour. About 10 men per mile were used on the tractor lines while they were operating. These men completed backfiring and did the patrolling. The cost per chain of line built and held by trail builder was \$1; includes all charges on the tractor for the duration of its service on the fire.

Fire was temporarily checked at 830 acres. Because of the unavoidable delay in initial action coupled with adverse wind condition the fire could not have been held to a smaller acreage during the initial stages.

Later unpredicted adverse weather conditions were the primary cause of the fire spreading over a previously well-constructed line. The amount of unburned material in the fire enabled the wind to spread fire over a large area simultaneously (velocities up to 35 miles per hour). It is felt that even with the best backfiring job under the conditions which existed, the same situation would have developed.

The question arises as to whether more men could have held the line the next day, considering the fact that the line was a double trail-builder width. The fact is that the width of the line had little bearing on the situation. (It usually does not.—Ed.) The fire came over the line with such intensity and in so many places that any reasonable amount of manpower would have had no control over the situation.

In connection with the problem of backfiring out lines, especially under adverse conditions, it is suggested that a special backfiring-crew unit be considered as a part of our regular emergency organization. Such a crew would have been a material aid on this fire. Whether this type of crew unit could have prevented the fire from breaking out next day is debatable, but coupled with a larger amount of manpower than was used, it might have proved effective.—Edward Werner, *district ranger*.

Shasta—Deer Creek Fire—17,410 acres.—(Discovered when $\frac{1}{4}$ acre, 41 hours after guessed origin, this hang-over lightning fire was reached at 30 acres after 1 hour and 44 minutes travel time, 7 miles by truck and $1\frac{1}{2}$ miles on foot. Travel speed reported as satisfactory. Cover type was dense brush and reproduction with scattered mature pine and fir. Wind was strong both upon arrival and during biggest run.

Maximum daytime velocities for each of the 5 days of the fire were 23, 21, 27, 10, and 16. Out of 40 miles of line actually constructed, 5 miles were lost. Reasons checked for loss of line are: Improperly mopped up; improper location; not burned out clean; high wind; spot fires; and failure to backfire in time. One suspects that except for daily high winds the other reasons for lost line would not have come to attention; they usually do not when weather is favorable. Output of held line was .05 chain per man hour—just below our .06 to .16 bracket. Damages reported at \$148,840, including \$4,300 to protection forest; \$24,695 for more than 5 million feet of merchantable timber; \$112,845 for young timber destroyed; \$2,000 for recreation values; and \$5,000 for wildlife values.—Ed.)

The fire was first sighted at 10:38 a.m. At 10:52 a.m. Black Butte lookout reported a spot fire about .3 of a mile northeast of main fire. At 11:08 a.m., Supervisor Davis from the airplane sighted another spot fire about .5 mile northeast of main fire. At 12:03 p.m. Black Butte lookout sighted a spot fire on the ridge approximately 1.3 miles from the origin of the main fire. At 1:26 p.m. Black Butte reported a spot fire about .5 mile south of the mill road above Shasta River. This is a distance of approximately 4 miles northeast of the origin of the fire. At 1:30 p.m. Black Butte reported several spot fires at a point approximately 4 miles north of the origin of the fire. Elapsed time to this point is 2 hours and 52 minutes. (The lesson is that even when spotting and despite one's impressions, fires travel at a surprisingly low rate in miles per hour.—Ed.)

The chief reason for the loss of line was the strong winds which caused many spot fires at distances up to 1½ miles.

Tankers were used from the time the fire started until the fire was controlled. At one time there were eight tank trucks, including three stake-side trucks, each mounted with a 550-gallon tank and portable pump. These stake-side tankers, commonly called coffin trucks, were especially useful in refilling the regular tankers. Tankers were most effective in mop-up although they were of considerable aid in stopping the fire when it reached U. S. Highway 99.

If I had the job to do over again I would have taken the same action in controlling the fire. Because of extreme weather conditions it was impossible to hold this fire to a Class B or a small Class C. However, this fire originated in a blind area and apparently started 2 days before discovery. This failure in our detection system should be corrected or we are likely to have such a major fire as this during any fire season. Emergency detection is being given consideration in the fire replanning project which is now under way.

But this fire also brings out a weakness in detection from airplane observation. At least two trips had been made directly over this area after the lightning storm without discovering this fire.

During the first 8-hour period of the fire many more men were obtained than our service of supply could handle. Of course, this was undoubtedly a result of the numerous large going fires at the time which spread out the forest resources; nevertheless, I believe greater efficiency will result from an even balance between manpower and the facilities for supply especially during the first attack.

Again the need of excellent working equipment was apparent. At a

very critical time, the first afternoon of the fire, one bulldozer broke down which necessitated a change in strategy. Had this bulldozer been able to continue, backfiring would have been done much earlier in the evening and a cleaner backfire would have resulted. (Machine failures are prominent in many reports for the year from the Shasta and pretty much from the whole of the National Forest regions.—Ed.)

Two fire camps were constructed the first afternoon of the fire. Naturally the most experienced men were put in charge of these camps. As the fire increased and more camps were installed (total of 5) men with less experience in fire camp organization were in charge of the camps. This caused considerable confusion due to no fault of the men in charge of the camps but just a lack of experience on their part.

On all of our fires the first shift of feeding, issuing tools, etc. causes the most confusion. I believe that if the most competent men are left in one camp only long enough to get things properly organized and then go on to another camp and perform the same duties, we will be solving a big problem. A very competent man in fire camp organization is mandatory when a camp is being installed if we expect to reach a high degree of efficiency.

(Perhaps we take our fire "campology" too seriously. Important lessons are being learned from 40-mancrew experience. If we could really study the camp and feeding problem with complete freedom from the strong habits which have grown up, would we necessarily come out with the same ideas and practice we now commonly apply?—Ed.)—William A. Peterson, *district ranger*.

In several cases, Shasta district rangers have mentioned disparagingly the type of tractor equipment and transportation for this equipment which we are using. Along this line the matter of whether or not we are overmanning our fires considering the tractor equipment which we now have and use has been discussed at considerable length. It has been the consensus that we probably have been overmanning our fires in many cases but that this has been done as a safety factor because the tractor equipment which we get and use on fires is still, in altogether too many cases, not the best of equipment and consequently not the most reliable available. Also poor transportation enters into the picture somewhat.

It is hoped that heavy equipment on fires has now proved its value and that we may get away from the use of old, obsolete, and undependable models in the very near future. If this can be done, thus giving the fire boss confidence that he will obtain a certain planned-for production from the power equipment, the problem and consequent expense of overmanning should be eliminated.—G. K. Fox, *administrative assistant*.

Shasta—Saddle Mountain Fire—2,900 acres.—Seven hundred and ninety-three chains of line were constructed by tractors of which 180 chains were lost. Six hundred and thirteen chains of tractor line were held. Four hundred chains of hand line were constructed, of which 367 chains were held. The heavy line loss in the tractor line occurred in the afternoon when the wind was high. (Forty miles per hour at time of biggest run.) Thirty men were required behind each tractor to hold and backfire line. Two hundred and eight chains of road were backfired and held as control line. The average speed of construction of

held line was .6 chain per man hour. Tractors were the large factor in the control of this fire because much of the line was through heavy brush where it would have been slow to construct and hard to hold.

The important thing I learned from this fire was that more prevention is needed in hazard reduction on roadside clearing. This fire started from burning material thrown from an automobile along State Highway 299 in a grass and brush area. It started on a slight in-curve. Had the gutter along this highway been cleaned of inflammable material, the fire would not have started.

This fire also brought out that when a fire starts in a grass-brush area with a fuel moisture of 2, a humidity of 12, and a 10-mile or better wind, the only method of controlling it in the initial attack is to be able to reach it quickly with water.

The danger-rating system in this region is comparatively new but in my opinion quicker build-up of manpower for patrol should be worked out when it shows a Class 5 or 6 rating. Under the present system our build-up is based on the danger ratings of the previous day. I believe noon readings should be taken each day in bad weather and if a Class 5 or 6 rating is shown, that a build-up then should be made.

This fire brought out again the value of tractors for building line, but we need better tractors and better transportation for them. At present, when a tractor is ordered for a fire, we do not know whether we will get it in 1 hour or in 3 hours, and what condition the tractor will be in when it arrives. Also there should be a good supply of trained operators lined up for the tractors.

This fire brought out strongly that we need more tank trucks in flash-type areas, for water is the only means of stopping fires in this type until night.

(Is that going a bit strong? The idea "wait till night," can be a disastrous force when it really takes root. There are many fires in flash types where no tank trucks are available and could not be put on the lines if they were. The tendency to become a "one-method man" hangs over all of us.—Ed.)—Oscar L. Barnum, *district ranger*.

Shasta—Bollibokka Fire—1,741 acres.—(The full report on this fire by District Ranger Gilman should be entitled to some kind of a prize as a study in fire-fighting futility and frustration. It isn't often in this fourth decade of systematic forest-fire control that so many things go wrong on one fire. Unfortunately, the editor can find no way of highlighting the report so others can share his experience without destroying the very things he wishes to pass on.—Ed.)

This fire became large because during a heavy lightning concentration there were insufficient qualified men available to make an early initial attack.

The main significance about this fire continuing to get large is the same old story in country difficult of access and with few trails. It is a picture of partially exhausted men arriving in the fire camp, and by the time they arrive on the fire line on some high ridge they are often more of an unhappy liability than an asset. Again we reenact the tragedy of vainly and frantically endeavoring to get first night control. If the terrain is not too tough we may succeed in getting a line around the fire, but not backfired in time to keep the main fire from sweeping over.

(A chance at that point to ask some questions?—Ed.) The cure? It would be fairly simple if we had the funds in advance to construct a nuclei of tractor trails (not wide firebreaks) along main ridges and spurs. Then when our fires developed into the Class C stage we would have little construction to do and could probably get our backfiring done in time to hold the fire to a small compartment.

We could have saved much exhausting travel time ($2\frac{1}{2}$ hours from camp) by using the cargo plane earlier to drop provisions on main ridge and put fly camps up there.—John Gilman, *district ranger*.

Shasta—Big Valley Mountain Fire No. 100—743 acres, all on protected land outside boundary.—(When fire started on July 22, fuel moisture was 2, humidity 12, and wind velocity 23 miles per hour. Discovered 6 minutes after known origin at $1/20$ of an acre. The fire was reached 22 minutes after discovery, at 20 acres. Corralled 12 hours and 37 minutes after arrival with a maximum of 306 men engaged.—Ed.)

Five hundred and fifty-six chains of tractor line were constructed. One hundred and sixty-one chains of line were constructed by hand. Average amount of held line per man hour was .6 chain. Tractors saved much time on the fire as it was in heavy reproduction which had been logged over. There was much slash and down timber. Hand line would have been slow to construct and hard to hold. The line was also worked with tractors so that tank trucks could travel over most of it to mop up fire.

One thing brought out by this fire at the start was the need of more fast tank trucks located in flash type areas, equipped with radios and put on patrol duty during days when the danger rating is up.

Like the Saddle Mountain fire, this one brought out the need of hazard reduction or roadside fireproofing through grass areas, to prevent fires from starting. Had the grass been cleaned out of the gutters on State Highway 299 it would never have started.

One of the outstanding helps to control this fire was the use of saddle stock for overhead at an early stage and the use of horse trailers to get the horses to different points along the fire line.

The use of bulldozers in construction and also in mop-up, showed the value of such equipment on fires. The one thing that made it possible to hold the fire was the fact that by aid of all the bulldozers we widened the lines out and built short roads so we could get tank trucks nearly all the way around the fire for mop-up work.—Oscar L. Barnum, *district ranger*.

Shasta—Stein Canyon Fire—431 acres.—(This incendiary fire with three sets was discovered 2 minutes after known origin at 10 square feet and reached at 10 acres by 7 men, 1 hour and 27 minutes later after 10 miles travel by truck and 1 mile on foot. Wind, light and moderate.—Ed.)

This fire became large because the three sets at an interval of $\frac{1}{4}$ mile were more than the initial crew could handle.

Everything seemed to click on this fire both on the line and in the camp. An RD-7 tractor was used during the first afternoon in actual construction just in advance of the head of the fire, and was an important factor in holding the line.

More intensive law enforcement is needed to place these fire bugs

behind the bars, and a shining example would have more effect in prevention with that particular class than 20 years of lectures.

This particular fire presents no new significance.—John Gilman, *district ranger*.

Shasta—Pittville Road Fire—327 acres.—(Discovered in 13 minutes from known origin, this lightning fire was reached 29 minutes later by a guard and four men. Fuel moisture 2, humidity 11, and wind velocity 26 miles per hour. Brush and grass type cover.—Ed.)

If it had not been for tank trucks, this fire could never have been held. One hundred and ninety-five chains of line were held with two tank trucks. Hand or cat line would not stop the fire, but by wetting it down with a tank truck, line could be built in close and the fire would not cross. Men and tractors could not build line fast enough to head the fire off or hold line after it was built. When the fire started, we had four tank trucks working on the Big Valley Mountain fire and these tankers were rushed to this job.

The area was so that you could drive a truck clear around the fire. Two men were put with each tanker to handle the hose, and the edge of the fire was killed with the water, and a crew of men with McLeod tools followed the truck and constructed the line.

This fire brought out the fact that we do not need high-priced pumping equipment but trucks that are fast and not overloaded. The truck that did the most effective work of this fire was a G.M.C. on which was mounted a 700-gallon tank with a portable Pacific pumper, equipped with a by-pass valve on it. One hundred and three chains of fire line were held with one tank of water. (This is understood to mean that he doesn't like the permanent mounting of a tank with elaborate valve systems, power take-off, etc. Prefers a plain high-powered, high-capacity truck. Seven hundred gallons of water means over three tons of pay load to be rolled over bad ground. When needed, a 700-gallon tank may be loaded on the truck and the water applied by means of a portable pumper. When not needed for fire, the truck can be used for other purposes. District Ranger Barnum can probably get plenty of argument on this point but it sounds like he has something to argue about.—Ed.)

This fire also brought out the fact that where we use equipment on fires, we must have trained men on it. The men on the equipment on this fire had been with the equipment on two larger fires just previous and knew what to do.—Oscar L. Barnum, *district ranger*.

Southwestern Region

Coronado—Mansfield Fire—300 acres.—(This fire illustrates the fact that as one risk of man-caused fires is cured, another risk is often disclosed. Here was a miner so careful with fire that "he regularly saved his ashes in a tub until they cooled, then emptied them only in the sand wash." Also his cabin's stovepipe was safeguarded with a cap on top which seems about the best he could have done. Yet, it seems that in the high wind, a spark must have blown from under the cap on the stovepipe to a point some 30 feet away on the steep hill near the cabin. There may be an important and practical answer for this particular risk. If the chimney spark arrester developed by the California Region can be manufactured commercially and made readily accessible

at a reasonable price to the public, we can urge people to equip their flue outlets with this very promising safety devise.—Ed.)

Lincoln—Cedar Creek Fire—1,157 acres.—(Here is one of those pernicious fires from hot ashes dumped on inflammable material. Occurred in a recreational area on private land. This fire led to the appointment by the district judge of a fire warden and preparation of a detailed fire plan for the area. Wind was from 19 to 38 miles per hour. Spot fires ruinous. Ten CCC boys were pulled off of what proved to be the worst one by an official (not Forest Service) who took them to help him move a camp he had farther up the canyon. Output of held line was .87 chain per man hour which is better than usual even for this low resistance-to-control type of country. Perhaps the absence of the word "strategy" in the report is significant. With little if any previous experience on larger fires, District Ranger Gray handled a fast and complex battle without knowing apparently that he had to have strategy. Perhaps he had benefited from the training Region Three now gives, using as a classroom, an actual burned area with its layout of lines where the construction and the fighting had succeeded or failed.—Ed.)

Carson—Pueblo Canyon Fire—475 acres.—Since the Taos Pueblo Canyon fire was the first on this forest in nearly 20 years to exceed 300 acres, probably the most outstanding thing was the opportunity for all forest officers connected with the fire to check up on their shortcomings in fire suppression. Furthermore, since the occurrence of this fire, it is believed that the entire community is much more fire conscious owing to the tremendous interest during and since the fire.

During the start of the fire considerable dependence was placed on Indian fire fighters who were available under their cooperative agreement for suppression. It is now believed that Indian help should not be relied upon for suppression of large fires. (How would it do to try instead the idea that the art of living together and the maintenance of interest in forest protection were at fault rather than the Indians. Less advanced Indians than these are prize fire fighters in places. But, like whites, they go into a sit-down readily if they do not understand or if good relations are not maintained.—Ed.)—C. A. Merker, *forest supervisor.*

Northern Region

Kaniksu—Gleason Mountain Fire No. 47—9,344 acres.—(The report claims that when reached by the first 14 men, 1 hour and 55 minutes after guessed origin and 61 minutes after discovery, the area of this lightning fire was .03 square feet or about $4\frac{1}{3}$ square inches—which undoubtedly proves something. Perhaps the reporter meant to say .03 acres at arrival. But when corralled, 9 days later, with a maximum of 1,114 men engaged, the area was 9,344 acres. Fire was $\frac{1}{2}$ mile from the road. Output of held line, .03 chain per man hour. Twenty-nine miles of line actually built and 9 miles lost. Material first ignited was slash. Wind, 1 to 3 miles at arrival, but 39 to 54 miles at time of biggest run. Report says no back pack pumps were used but power pumper worked 432 hours. Tractor used on $1\frac{1}{4}$ miles.—Ed.)

The Gleason Mountain fire occurred in a 1925 and 1926 single burn. The snags on approximately 2,000 acres of the area had been felled

during the past winter and were to be burned in the fall. The remainder of the area had been set up in the work program for similar treatment.

The hazard of fires in snag areas, to human life, was again driven home. Two men were killed on the fire—both by falling snags. The fact that more were not killed can only be attributed to the continual watchfulness of foremen and an almost 100 percent exclusion of night patrols. We lost some line by not placing night crews, but the line that was lost saved lives. At least one of the men could have been saved if he had been wearing a helmet of the type steel workers use, and there is a possibility that the second fatality could have been avoided if the same protection had been afforded. (Maybe here is where the editor has to learn a lesson. He has not considered hard hats as quite practical—thinking of the need of a floor in Bradeen's warehouse for hat storage; truckloads of hats being dispatched to fires but seldom required, and left along the line by workers who find them intolerably uncomfortable; and the instances when a man's whole body would need to be encased in armor plate to save him from a snag. But if, in the well-considered judgment of the men directly responsible for lives on the lines, hard hats are really practical and will really save lives, then the editor is for hard hats.—Ed.)

The inherent danger of snag fires is always going to be present and we are going to continue to lose men in them no matter how intensely we train, how careful we watch, or what methods we use. A 100-foot snag silently falling through smoke-laden atmosphere has too great destructive potentialities. A man using tools can't keep his face upturned and foremen and straw bosses can't keep men under constant observation when they are strung out as they must be. Snags, especially when fanned by any wind or heat-generated whirlwinds, are continually falling, and fatigued men react slowly. A foreman can't dodge a snag for his men.

In the light of my experiences on the Gleason Mountain fire, I wish to make the following recommendations:

1. Prosecute a vigorous hazard-reduction campaign for the snag patches to be felled, burned, and planted. Good business in itself.
2. Do not work crews too long hours in snag areas. Fatigued men do not function normally.
3. Select the most experienced fire crews insofar as possible, for work in these areas.
4. Supply some type of steel workers' helmets or equivalent for the men. Expense of helmets should not be great and they should last indefinitely.
5. Eliminate night work in snag areas insofar as possible.
6. Locate control line on lee side of divide to reduce exposure of men to terrific heat and smoke from fire coming up the slope. (Naturally. Why even consider any other line location.—Ed.)—B. A. Anderson, *assistant forest supervisor*.

The outstanding lesson given new emphasis by this fire, is that felling of snags and clean burning of the debris in heavy fuel old burns appears to be the only effective way to head off conflagrations during drought years.

Early spread of this fire rapidly brought an important part of its perimeter to the edge of an area where hazard reduction had previously

been completed. This was on the north and east of the fire in the direction of the prevailing wind. Here the fire stopped of its own accord or was controlled with comparative ease.

Had this area not been cleared, the probability of a second Pete King fire (Selway 1934) was great.

There remain several contiguous heavy fuel bodies of this same type on the Kaniksu; one promising a future fire of possibly 2 or 3 hundred thousand acres. Other North Idaho forests have similar areas.

As long as these remain—threatening, nonproductive cancers on our whole forest—so long can we be assured of occasional failures to have reasonably satisfactory fire control.

Attacking this hazard reduction problem with our meager resources means it will be a longtime job. Nevertheless, plans are under way to push the program as vigorously as possible.

Areas now reproduced with valuable young growth will be gridironed with wide strips located strategically to assure control of potential fires within logical topographic units.

Where reproduction is lacking or virtually valueless, the cleanup will be 100 percent followed by tree planting on good sites and game feed species or grass planting on others. Priority will progressively be given to the areas having greatest strategic value in control of subsequent fires.

Action on this particular fire was good; in fact much better than can be expected on the average North Idaho forest. Crew and overhead resources readily available far exceeded that contemplated in the fire plan, due to the presence of blister rust and CCC crews in that area.

No important tactical errors were made, except the occasional sector where direct action was tried when indirect methods, using topographic breaks, were indicated. This was recognized by the forest personnel and early corrective action was taken.—A. G. Lindh, *acting regional forester*.

Nezperce—Kelly Creek Fire—17,007 acres.—(From a point 70 feet away at 6:40 a.m. with an 8- to 12-mile wind, a miner saw a fire of 60 square feet started by his son for an unknown cause, 2 minutes before. He lost no time in getting there but when it was corralled 10 days later, a maximum of 758 men had been engaged, expenditures were over \$30,000 exclusive of CCC, and the Nezperce had another big fire in its record. Wind at time of biggest run was 25 to 38 miles. One hundred and thirty-four miles of line were actually built, mostly in grass, probably bromus tectorum at the lower levels and bunchgrass higher up, if I remember the country correctly. Of the 134 miles of line built, 96 miles were lost. Output of held line per man hour is given as .2677 chain. The Southern region doesn't use so many decimal places in reporting output on its grass fires in level country. Reasons checked on the form for loss of line are: Improperly mopped up, improper location, not burned out clean, high wind, lack of patrol, spot fires, and failure to backfire in time. Damage is not reported in dollars but included 560 acres of reproduction, nearly 14,000 acres of forage for livestock and probably a good winter range for game.—Ed.)

The ranger district concerned was manned in accordance with high Class 5 danger (on a 7 Class danger-rating scale.—Ed.) Fuel moisture was rated 4.4 and under during the period before the fire occurred and

through its burning period. All the people living in that area had been contacted several times about fire by an able contact man.

The entire forest organization had suppressed numerous Class A, B, and several Class C fires in the period preceding this fire. These fires served to check our training, organization and action plan for the several ranger districts and CCC camps.

The points brought out by this fire that need further attention and followup action are as follows:

1. Further study and knowledge is needed of resistance to control of such fuels as cured grass on precipitous slopes. (Will this study include a search for methods of fast construction and backfiring in grass?—Ed.)

2. Further training and assignment on going fires of headquarters guards and foremen to be trained as scouts. (How about using this area with its 96 miles of lost line as a classroom?—Ed.)

3. Due to the lack of sufficient funds to hire temporary personnel it will be necessary to train cooperators and use them as extra foremen in time of fire emergencies. (Why not do it anyway, no matter how much money there is?—Ed.)

4. The CCC transportation was not up to our fire requirements and need. This was due to age and mileage of trucks and steep, dusty roads. It would appear that a truck having a mileage figure of 20 to 30 thousand miles should be serviceable. This is not the case with our steep, long pulls, that place a new truck in the old-age class rapidly.

5. It is planned to use the team and plow to better advantage on such fires in the future. A line to backfire from can readily be made by such a unit.—W. G. Guernsey, *assistant forest supervisor*.

The Kelly Creek fire was started on August 22 in the bottom of the Salmon River Canyon at an elevation of some 1,400 feet. The precipitous canyon walls extend from that elevation to some 7,000 feet in a horizontal distance of less than 6 miles. An unusually heavy crop of grass had matured and cured in July. By August 22, it was the driest ever observed by local officers. Wind conditions during the first several days of attack were severe and did not subside during the night as normally occurs in that locality. Freakishness of wind behavior played havoc with plans. No down-canyon draft occurred. Prevailing direction was reversed and early morning gustiness was common.

Some Regional Office comments upon Mr. Guernsey's statement are as follows:

1. The statement that further study of resistance to control in such fuels is based upon the fact that manpower per chain of perimeter, usually adequate, was insufficient on this fire. Initial forces and first reinforcement were adequate when gauged by past experience, yet fell short of accomplishing objectives. Miscalculations—yes—but due to conditions never before experienced in that type of fuel and topography. We did not know what extreme conditions were. The Nezperce asks that we attempt to determine the requirements for meeting such conditions. (Hope you won't slip off into a scientific study of resistance to control to the neglect of the art of converting energy into control line at a high rate. Also, there are the reasons checked on the form for the loss of line. Are they worthy of study? If the region and the forest already know the answers on line location, backfiring in time, etc..

then how about a fresh study to discover how to get knowledge applied? And couldn't the forest take a hand in this instead of leaning on the Regional Office?—Ed.)

The Nezperce, like all forests, finds that scouting is a job of such requirements that only men of wide fire experience and training are qualified. When a bad "bust" occurs, such men are usually tied up with management jobs in the suppression organization. Second-raters become the scouts and scouting suffers. Some rather serious losses resulted from poor scouting on the Kelley Creek fire. Two remedies are available and will be used in the future. Greater use of scouts (and all overhead) from other forests will be planned. Airplane photographers will be used. (It seems to me we fail to grasp our scouting problem fully. Men of wide fire experience for scouting are always going to be scarce on a bad fire because such men are so productive on work other than scouting. How to get manless scouting is our problem. With apologies to the pilot and photographer, airplane photographs may be one real answer. There are other possible answers but they run into questions of theory and organization and are another story.—Ed.)

Lack of sufficient funds to hire temporary personnel is a weak spot regionally as well as on the Nezperce. Cooperators did reach the fire at a time and in sufficient numbers that the fire should have been controlled in its early stages. Had regular guards, highly trained and experienced, been available, the Kelley Creek fire might never have become a 300-acre blaze. (But your neighbors across the river, think you already have quite a few regular guards on the Nezperce.—Ed.)

More trucks per camp are needed to meet fire-control requirements.

The inference that special equipment, such as the horse and plow, was not used to full advantage is correct. (That hurts, coming from the Northern Region, which once led the world in the use of the lowly horse and plow. Guess we can't make the horse and plow tool an interesting one unless we attach a gas engine or a pair of wings.—Ed.)

That plows, trenchers, airplanes, and other special equipment, which might have speeded control, were not used, is explained by the fact that the suppression force was always just on the verge of control and success seemed certain with the tools at hand. (This is a real problem. Your neighbor across the river and plenty of others have suffered heavily from the same error of judgment. The answer is not easy to find.—Ed.) Furthermore, line construction was not a great problem. They were hooked up repeatedly *but* lost. This fact caused administrators to discount the importance of rapid line construction and to devote thought and energy to clean up firing inside. The Nezperce is correct in planning use of special equipment on such fires in the future. Quicker built lines permit more time for backfiring and inside cleanup.

One important point and perhaps the main reason why the Kelley Creek fire was not controlled before reaching 300 acres, is that wind conditions were consistently opposite to normal in characteristics. It blew uphill all night. No lull occurred during the first 24-hour period. Attack was based upon suppositions that down draft would occur at night. They did not come. The lesson here is: When fuels are sufficiently dry to burn and slopes are such as to accelerate spread, we must not assume that weather will ever be in our favor. We must become pessimistic optimists and plan to defeat the worst. As we learn more

of the science of gauging fire behavior ahead of time, this weakness will be diminished.—A. G. Lindh, *acting regional forester*.

Bitterroot—Goat Mountain Fire—3,000 acres.—(This is the fire on which Assistant Supervisor Sutliff crashed with Pilot Dick Johnson to whom countless Forest Service lives have been entrusted over the years. They were caught in a down draft while looking for a new camp site at which to drop a load of supplies. Both men escaped by a miracle. From the pictures of the wreckage, you wouldn't believe a flea could come out of it alive. Forest Service luck has held good throughout 20 years of hazardous flying—except in the case of Pilot Duck of California who was killed while bringing home a cargo plane with which to carry out a Forest Service contract. But there was more than luck involved in this case. When the assistant supervisor came to after the crash he succeeded in tearing himself loose, and with the fire threatening to sweep over them, extricated unconscious Pilot Johnson with the aid of a rock to batter off parts of the plane where Johnson was trapped head down. It took much determination, and, so it seems to the editor, some plain heroism. The assistant supervisor utterly denies the heroism. It was just part of the job so far as he is concerned. Bragged about fact that although Johnson had to be "scooted and dragged" down the mountain and carried out on an improvised stretcher, neither of them ran up a bill for the insurance companies or the Compensation Commission. Was worried only about the financial blow to the Johnson brothers who had lost two planes in a year on Forest Service flying. The editor is so glad that both men are alive and not permanently injured that he can't inject embarrassing remarks in the assistant supervisor's comments on the fire.

Forty-one days had elapsed since the last rain of more than .2 inches when this lightning fire was discovered in the Switzerland country of the Bitterroot. Travel time was 4 hours for 6 miles by car and 8 miles on foot. Fire was 20 acres when reached. Only 200 chains of line were actually built on a 1,000-chain perimeter, and of this 200 chains, 70 were lost. Output of held line was .018 chain per man hour in medium—medium fuel type. Wind, 4 to 7 miles at arrival and 13 to 18 miles at time of biggest run. Corral time is given as 47 hours. Maximum number of men engaged, 20 year-long Forest officers and 245 others. No damage is reported except the standard rate of \$1 per acre for protection forest. Cost of the fire was over \$12,000.—Ed.)

An abandoned camper fire believed to be the direct cause. Prevention action considered adequate from local standpoint when compared to size of local prevention problems and man-caused fire risk. Public educational program from a national standpoint considered inadequate. Law enforcement angle exceptionally weak. Presuppression action O.K. throughout in accordance with existing fire-control plans. Initial dispatcher action adequate. Initial suppression action inadequate. Wrong tactics applied and manpower resources distributed on wrong portions of fire. This action resulted in escape of fire after having been practically corralled, which in turn resulted in approximately 85 percent of area burned. Secondary suppression action satisfactory insofar as increased burned area is concerned.

Recommendations are:

1. Broader national prevention educational program followed up by intensified local programs. These programs should not be confined strictly to fire control activities. Instead, it is felt that fire control will benefit to a greater extent if a broader forest resource program is carried on.
2. More rigid law-enforcement work is essential. Greater support from the legal end and other law-enforcement agencies is needed. Also more training of fire guard prevention men and special Forest Service law-enforcement employees.
3. There is need for recasting the entire large fire suppression set-up. The possibilities of present-day methods have been exhausted. Prevention and presuppression work as well as the service of supply phase of large fire suppression work have progressed materially. On the other hand, suppression tactics in the past 20 years have been improved at a much slower rate and at the present time are far below the level of the various other phases of fire control. The one major change in suppression action during this time has been the present policy of flooding fires with large numbers of men with more than proportionate losses in efficiency and output per man employed. (This is exactly the idea behind such developments as the 40-man crew, the one-lick method, parachuting men to small fires as a means of keeping them out of the large fire class, the scheme of training with the recent larger fires as classrooms, the emphasis on use of tractor—trail-builders, Bosworth trenchers and tankers, and the Ogden meeting with all its possibilities for eventual developments in dispatching, organization, and management on line, training and better forecasting of the behavior of individual fires. The "gimme" attitude needs to be balanced by fresh and more determined efforts to climb to higher levels of intelligence and skill in the management of the battles on larger fires where most of our losses occur.—Ed.)

It would seem we have a choice between lowering our suppression expectancy standards or entirely recasting our suppression procedures. It is felt that the present-day organization is developed to the maximum of efficiency insofar as present-day methods are concerned. As long as we deal with large numbers of men endeavoring to make skilled suppression crew organizers out of them with the opportunities of training, demonstration, and experience dwindling, we must expect the average number of human errors to occur with a corresponding amount of burned area resulting.—C. B. Sutliff, *acting forest supervisor*.

Increased emphasis on training of all classes of overhead, if it can be justified considering increased training demands in all fields of Forest work, will, no doubt, reduce the area burned annually. The Forest is correct in emphasizing the weakness in the present training program; namely, too great an annual turnover in skilled overhead so that training efforts are wasted. Increased stability in organization through increased regular appropriations will help avoid this weakness.—A. G. Lindh, *acting regional forester*.

North Pacific Region

Umpqua—Rondeau Burn Fire—537 acres.—(Discovered at "spot" size, 16 minutes after known origin, this lightning fire was 2 acres when reached by 21 men after 9 hours night travel time for 12 miles by truck and 9 miles on foot. Two and one-half hours of the travel time went into hunting for the fire. Four hundred and sixty-five chains of line actually built. One hundred and twelve chains of this lost. Reasons: high wind and snags not felled. Output of held line, .049 chain per man hour. Damage reported at \$695. Cost of suppression over \$29,000.—Ed.)

It is, of course, regrettable that this fire took the second run after being definitely under control for some 13 or 14 days and resulted, no doubt, from the fire boss' failure to spend more time along and immediately inside the control line rather than attempt to put out all visible smoke regardless of distance inside. (Not the first time this has happened.—Ed.)

The rains the last few days in August, caused the fire to die very rapidly and before mop-up crews had a chance to burn out dangerous islands of scorched reproduction and brush. It was in one of these areas that the fire started its second run.—*Avery E. Berry, district ranger.*

In reviewing action on the Rondeau Burn Fire, there were, in my opinion, two outstanding lessons emphasized. They are as follows:

1. One or two good firemen would have made better travel time and arrived at the fire much quicker than the 20-man CCC crew. They could have hotspotted and perhaps coralled the fire, holding it to a smaller area, until the arrival of the CCC crew as a follow up. Then, by applying the efforts of the 20-man CCC crew to this smaller acreage, there is a possibility that it could have been held. In other words, use a small number of men on initial action, the larger and therefore slower crew as a follow-up.

2. A more systematic control of the burned area might have prevented the fire from escaping the second time.—*Ray B. Hampton, fire assistant.*

The Board of Review developed that the closest man was not dispatched to this fire, travel time was slow, follow-up action was a jump behind the fire, inspection of action was inadequate, a mop-up plan was not prepared, and mop-up work was not adequately inspected and possibly not adequately supervised. It should also be pointed out that 50 other lightning fires were burning on the same ranger district while action was being taken on this fire, three of which were Class C or larger, resulting in the heaviest fire load on record for this district.—*C. Otto Lindh, in charge of fire control.*

Chelan—Little Bridge Creek Fire—940 acres.—(Discovered instantly upon the lightning strike, this fire was 100 acres when reached by four men, $5\frac{3}{4}$ hours later after 4 miles travel by automobile and 16 miles by horse. Output of held line, .3 chain per man hour. Damage reported at \$940. Cost of suppression over \$12,000.—Ed.)

The above fire was one of the first to start from the storm of July 13. It was realized immediately that it would be a difficult fire. Accordingly, a key man with three experienced firefighters were sent in by saddle horse and our best 40-man CCC crew followed up promptly—on foot for 12 miles.

Due to steep, rough terrain and changing winds, the fire crowned and started a series of spot fires. Some of these burned together and some were fought separately. It was evident that a larger follow-up crew would have been of no avail. The 40-man CCC crew built control line on one side in good time with the one-lick method.

Assistant Supervisor Mitchell and Fire Assistant Anderson scouted the fire by plane and advised against trying to rush enough men into the fire to control it in the first burning period. The men could not be taken care of or worked efficiently because of the long pack and steep country. It was also determined that the sudden flare up of this fire was caused mostly by the sudden drying of the top and lighter material immediately after the snow had left at this high elevation. The responsible Forest officers reconciled themselves to confining the fire to the upper basin, although extra period.

The crew was organized for as efficient mop-up as possible, with pumps, gravity systems, horse packs, and back-pack cans. At the Board of Review it was determined that if it were to be done all over again under the same conditions, the action could not vary a great deal anywhere.—Walter E. Anderson, *acting supervisor*.

Deschutes—Horse Ridge Fire—980 acres.—(In this gentle slope country with grass and sagebrush cover, 2.3 chains of held line were produced per man hour. Far below Supervisor Bryan's standard of 6 chains per man hour in similar countries but better than the 1938 average of 1.67 chains per man hour on larger fires in the Southern Region.—Ed.)

Cat and Killifer did immediate and effective work but because of lack of extremely heavy patrol and unusually heavy variable winds and whirlwinds the fire jumped the line in several places at the same time. Although the Killifer line was backfired immediately behind the machinery, the winds continually swept the fire over the line. The only possible way of holding this initial Killifer line would have been to have at least 25 men behind the machinery at the start of first work; these men, of course, were not available.

The detection, despatching, and action on the fire are considered satisfactory. It is believed, however, that the Cat and Killifer unit should be a three-man job; namely driver, line locator, and a shovel man to clean out the line immediately behind the machine. The line constructed by the machine is sufficiently deep without anyone riding the plow. The crew despatched to this fire with the Killifer unit consisted of a line locator and driver.

In this fuel type the brushbuster is superior to Cat-Killifer units because of greater width of line constructed. Cat-Killifer unit should always be accompanied by a propane torch for backfiring. This should be fastened to the unit to be immediately available when needed.

Mop-up with 1,000-gallon tank truck and Edwards pumper was outstanding. This truck was not a fire-truck unit but was temporarily borrowed from a crude oiling job.

Two men should always accompany the brushbuster unit as operators besides the follow-up crew on the fire lines. On this fire the brushbuster operator worked too long without relief.—J. O. Lammi, *district ranger*.

Fremont—Moonshine Spring Fire—608 acres.—(Reached at 1 acre,

59 minutes after discovery by a lookout fireman, this smoker fire required 40 hours to corral. Failure to backfire is given as the reason the fire was not corralled within the first 17 hours. At one time District Ranger Quackenbush climbed up on a rim rock and saw ahead "a long string of spot fires, not very wide but about 1 mile long." Wind up to 20 miles reported.—Ed.)

This fire was a practical demonstration of the fact that fire danger boards cannot be depended upon always to represent extreme burning conditions. The indicated class of day was 4 (on a 7-class scale), which is normal for this area. However, this fire burned and crowned with a rapidity and continuance which was extreme. Humidity, especially its accumulated effect, local drafts, and steepness of slope are so localized that scattered fire danger stations cannot represent them. The judgment of experienced fire men must still take precedence.

There was also demonstrated again the fact that the one-lick method of line construction, like machine work, must be followed up closely by enough manpower to hold and mop-up quickly the line already built. (In this connection, old-time logging bosses followed a management principle—which, however, they never called by any such a tony name. They gave first attention to the first of the sequence of operations. This put all the subsequent operations in the sequence under pressure to keep up, and made the logging bosses' work easier and more effective. Fire suppression operations have not yet been thought about clearly as a sequence. Too often we get the sequence all messed up—mop-up ahead of backfiring and lineholding, for example. The result is usually disastrous when luck refuses to cover up our mistakes. But the logging bosses' principle is a good one for fire suppression. Speeding up of line construction by machinery, a 40-man crew, or the one-lick method immediately puts on the pressure for more preparedness and more snap in the functions of backfiring, lineholding, patrol and mop-up—a thoroughly wholesome situation, provided we respond to the pressure for making each function keep up in its proper place in the series.—Ed.)

One CCC crew of approximately 30 men held too close to the fire edge in the brushy canyon to complete the line and burn it out before the fire crowned over it.—John G. Clouston, *associate forester*.

Mount Hood—Boyer Fire—5,460 acres.—(This incendiary fire, attributed to a traveler, was set in two places in slash brush with the wind at 25 to 38 miles. Only 12 chains of line were lost out of 26 miles constructed in 41 hours corral time. Held line output given as .08 chain per man hour. Damage reported at \$20,333. Cost of suppression over \$50,000.—Ed.)

This fire was one of those that after it had started, had to make its run. The first man arrived 15 minutes after started and was confronted with a roaring conflagration approximately 1 mile long and a quarter of a mile wide. (Report form says area was 30 acres when fire was reached.—Ed.) Because of adequate detection it was discovered when the first column of smoke appeared over a ridge between the point of origin and the lookout station. The fire was manned as quickly as possible. A developed transportation system throughout the area of the fire, which area burned over in 1929, enabled the fire chief to establish six camps by 11:00 a. m. of the day following discovery and com-

pletely encircle the fire with 1,400 men. All camps were located immediately adjacent to the fire edge, except the base camp, which was 2 miles farther away. (Hope it wasn't as bad as this suggests. Sounds like the objective was to establish camps and scatter crews around the fire. Sometimes this means to an end does come too near being set up as an end in the management of a fire.—Ed.)

The use of radios played an important part in the detection and suppression of approximately 50 spot fires located on the east end of the fire in the green timber. Radios of frequencies different from those used on the main fire were used as follows: One on a lookout overlooking this area, one with the crew assigned to the spot fires, and one at the district ranger's headquarters. This enabled the suppression crew to keep in touch with the lookout and protective assistant and thus control what might have developed into a serious conflagration on the breaks of Roaring River.

The use of machinery assisted in saving from destruction considerable area of plantation. A 55 and 35 Cletrac was used to construct over 6 miles of fire line.

While the fire was handled effectively, bringing out the above features, nevertheless, it was evident that if division bosses had been used in the initial attack as they were used later, a much more effective organization would have been evident.—A. O. Waha, *forest supervisor*.

Olympic—Deep Creek Fire—13,000 acres, but only 3,466 acres inside.—(The exhaust from a logging tractor outside the forest started this fire, which was discovered in 5 minutes at 20 square feet and reached at one-quarter acre in fresh slash with wind at 12 miles. Out of 13 miles of line built only 8 chains were lost. Output of held line given as .08 chain per man hour—better than on many fires in much lighter fuel. Rate of spread map shows daily spread on August 7, 8, and 9, then no change until August 19, when blowup occurred and fire entered National Forest. Damage inside boundary over \$300,000. Complete kill on 3,140 acres of National Forest land.—Ed.)

Since this fire started well outside the Forest under extreme weather conditions, from a logging operation, there was little that could be done to prevent the fire. (Room for argument there.—Ed.)

Plenty of competent overhead is the key to a successful suppression job. A call was sent out for the necessary overhead after the blowup and the organization necessary to control the fire was formed and functioned smoothly. Sufficient trained overhead was on hand to handle our key positions in the suppression force and to furnish assistance and relief on the more difficult jobs.

To have a good fire-suppression organization it must be used every year—this may be on your own or someone else's Forest. (But that is our problem—to prepare to handle an infrequent large fire well without benefit of large fires to practice on in the meantime. Training on actual fires is fine. There can't be too much of it. But we must find ways to train in battle practice without actual battles—just as armies have to do.—Ed.)

Progress is being made towards securing satisfactory fire-fighting technique. Out of the many miles of fire lines built and held, only one short strip was found that was not black to the line.

Going fires are the best place to train guards. Again this year we

used our experienced guards as foremen and sector bosses during the control period, and then made a flying shift, returning them to the stations to recuperate and take over presuppression jobs while the inexperienced guards were sent to the fire to mop-up and patrol.

Our figures for held line per man hour are worse than useless. They mislead us. In this case some 3 miles or better of fire lines were built and mopped up before the blowup occurred. In securing our held fire line up to time of corral, all this mop-up time must be included in the figures, also on a large and long drawn-out fire such as this, we had done some 3 days' work towards mopping up the first part of the line before the final sector was completed. These mop-up hours also are included. Probably half of the man hours counted in before the time of corral were put in on mop-up work. (Possibly O. K. on this particular fire, but too many fires have been lost by just this disarrangement of the normal sequence of suppression operations. Would you advocate an attempt to keep construction and mop-up hours separate during period of line construction?—Ed.)

Chemicals are useful on the fire line if the location for their use is hand picked. The Kempaks were especially good on hot snag fires or burning log ends where the wood itself was exposed. We plan to try these chemicals another year, but are not too greatly impressed with their possibilities where water is plentiful. (The place for chemicals is where water is *not* plentiful.—Ed.)—Vondis E. Miller, *assistant supervisor*.

Siskiyou—Horseshoe Bend Fire—2,030 acres.—(Discovered at 1/16 acre in grass and weeds, 11 minutes after known origin, this incendiary fire was reached by one man at 2 acres, 12 minutes after discovery. Area upon arrival also given as 3 acres. Wind, 13 to 18 miles. Evidence is that the one man could do nothing with the fire. Maximum number of men engaged, 23 Forest officers and 819 others. Damage \$10,058. Cost of suppression over \$25,000. One-quarter mile of line lost out of 15 miles built. Output of held line .049 chain per man hour. About the only satisfactory thing in the whole report is the frankness with which weaknesses are identified.—Ed.)

The principal lesson learned on the Horseshoe Bend fire is the need for better understanding of the principles of organization, responsibility, and authority. There is no question but that the Horseshoe Bend fire should have been controlled within the first work period, and failure to do so is attributed to personal failures. The failure points to a lack of initiative on the part of five qualified short-term employees to assume leadership or to cooperate to carry out what is usually considered as routine functions. Each one was hesitant to assume leadership, electing instead to "leave it up to the other fellow." (It is appreciated no doubt, how such a state of affairs reflects upon the District Ranger, the Supervisors' Office, the Regional Office and the Washington Office.—Ed.)

Apparently the breakdown was the outgrowth of past emphasis placed on job responsibility and authority, and which they applied restrictively. Based on this and other similar examples which have come to my attention, it would seem advisable not only to continue giving emphasis to organization, etc., but in addition, and to a greater degree than in the past, stress the need for exercise of good judgment at all times, alertness to changing conditions, and need for applying one's

self to meet unforeseen situations not anticipated by the management. In other words, supervision, especially on the fire line where conditions change rapidly, cannot be based entirely on mechanical formulae and without exercise of common sense.—L. L. Colvill, *assistant forest supervisor.*

Siskiyou—Eagle Creek Fire—20,180 acres.—The Eagle Creek fire was the result of eight separate incendiary fires set along 3 miles of trail on a critical fire day, with humidity of 19 and recorded wind velocity in the vicinity of the fire of 40 to 58 miles. The fire burned for 36 hours before a lull occurred in the wind, and during this time it covered approximately 20,000 acres.

This fire offered an opportunity to apply some of the lessons learned last year on the Chetco fire and which were enumerated in the 1939 July issue of Fire Control Notes. The principal comparable features of the two fires include inaccessibility, rough topography, and strong wind. The Chetco fire last year required 24 days to corral, burned 35,000 acres, and cost approximately \$273,000 to suppress; whereas, the Eagle Creek fire of this year required 4 days to corral, burned approximately 20,000 acres, and cost approximately \$50,000 to suppress (including \$15,000 State costs).

The favorable showing made this year was due principally to more complete suppression plans, better organization, and slightly better road and trail facilities. Last year our suppression plans and organization were based principally on use of CCC, which proved inefficient in inaccessible country requiring long trail hikes and transportation of supplies and equipment by pack-horse and airplane. As a result of our experience, it was agreed that future plans should provide for use of civilian fire fighters for back-country fires and should provide for organization and training of small crews of men possessing super physical stamina and provided with concentrated foods so that they could be self-sustaining for at least 3 days to "high spot" the critical points.

In 1939 our plans were made on the above basis and included the selection and training of a picked crew known as the 40-man Special Fire Suppression Crew. This crew fought effectively one of the inaccessible, critical sectors of the Eagle Creek fire, and they did not require servicing during the 3-day period of work on this fire. The other two inaccessible sectors were handled by similar-sized crews picked from road and logging crews and of men possessing above average woodsman skill and physical stamina. These two crews were not equipped or trained as was the 40-man crew and therefore required a minimum of servicing, and their production per man hour was considerably less. (Here was a chance to test out the merging of 100 to 200 picked other men with the 40-man construction crew. Forty men, even real he-men, are not enough for construction on the larger jobs. But there is a chance to gain much by filling in other men when the job requires it.—Ed.)

The low cost of the Eagle Creek fire is directly attributed to the work of the above crews, and also to use of inexpensive, "streamlined" fire camps. Other techniques employed on this fire to a much greater degree than in the past were "burning out" by the line construction crew and fast breakdown after corral of the fire. (Even so, the cost of suppression reported on form 929 is over \$1,500 per mile of final perimeter.—Ed.) —L. L. Colvill, *assistant forest supervisor.*

Siskiyou—Banner Creek Fire—1,535 acres.—The Banner Creek fire started in an area covered by logging slash and the initial spread was very rapid. The large Eagle Creek fire on the Chetco was burning at the same time and practically all of the CCC personnel on the forest and the trained overhead were working on the Eagle Creek project. We had also hired civilian fire fighters from nearby points which made it difficult to get the personnel needed to take initial action. However, advance arrangements made for FF crews in Marshfield, Coquille, Myrtle Point, Powers, Grants Pass, and Roseburg, made it possible to mobilize men and to get some effective licks in on the fire the first afternoon and evening, again demonstrating the value of making advance arrangements with employment agencies and key men.

The problem of supplying competent overhead was more difficult. This was met by using local woodsmen insofar as possible and by detailing overhead from neighboring forests. This experience points out the need for training more overhead in the regular and emergency organizations in order to enable us to fill the key positions on several major fires at once if necessary.

Despite the fact that our shock troops and most of the CCC personnel were concentrated on the Eagle Creek fire, the suppression work on the Banner Creek fire was pursued vigorously and the fire was controlled in very good time considering the burning conditions, difficult terrain, and high hazard. FF men were used on the more inaccessible parts of the fire and proved to be more versatile under adverse conditions than the CCC groups, although one CCC crew made an excellent showing on the southeast sector of the fire, demonstrating that carefully selected crews of CCC men who are well trained and under capable leadership can be used to advantage in back-country fire fighting if equipped with portable outfits and condensed rations similar to those used by the 40-man crew.

The Banner Creek fire was the second large slash fire of the season which leads the writer to believe we must attack fire prevention problems on logging areas more vigorously. We are considering the possibility of using one or more of our guards as prevention guards, whose duties would be to contact logging operations within the protected unit at regular intervals throughout the season, in an effort to build up and maintain a fire consciousness on the part of loggers, and to make sure that the fire regulations are being adhered to. (That's fine, but form 929 says this was a local hunter incendiary fire with four sets.—Ed.)

Wallowa—Deep Creek Fire—552 acres.—*This fire was handled by co-operators and was out before forest officer could get there.* (Italics by Editor.)

Location of the fire was in one of the isolated spots on the Forest, a pre-season fire and in a blind country without direct communication or transportation.

The lessons learned are as follows:

- (a) Continuation of our present cooperation with all settlers and stockmen in order that they will continue to take action on all such fires.
- (b) Get roads, trails, communication into these areas as quickly as possible. Also plan and execute a system of detection for such blind areas before the beginning of 1940 fire season.
- (c) That local mounted men are absolutely essential for the protection of such outlying areas.

(d) It is not felt that any elaborate placing of tool caches would be required due to the fact that these grass fires are principally fought with gunny sacks and water. We should furnish all cooperators with at least two 5-gallon water bags each.

Insofar as actual suppression is concerned, we learned that the stockmen who handled this fire saved the Government from a much more expensive fire, as it would have taken from 10 to 12 hours to have placed men hired in labor centers on the fire. These men would have been sent 61 miles by truck, 35 miles on foot and would have been useless when they got there. (Total cost of suppression given as \$251.—Ed.)

In order to rectify this situation, which will happen from year to year in spite of planning, we should expedite and continue as outlined under (a), (b), (c), and (d) in order that we can reach such fires while they are small. (Why (b)? Why not depend on (a), (c), and (d)? Why do the job by main strength and dollars if there is a better way? This experience seems to indicate that there is.—Ed.)—W. G. Miller, *district ranger.*

Wallowa—Imnaha Fire—470 acres.—From the fire line at the bottom of the slope where this fire occurred to the top of the ridge, a distance of 1½ miles horizontally; the slope is 80 percent. The slope is broken with numerous rims and slides, in many cases impossible to get through even with no fire to cut off access. The area had a cover of rank bunch grass and is used as winter range, and therefore ungrazed at the time of the fire. Two draws contained merchantable stands of ponderosa pine and Douglas fir.

Our emergency firemen attempted to reach the fire by going directly to it through heavy rims, but could not find a route through one heavy rim, so returned to car and took men back to Imnaha and up Sheep Creek, thence to top of divide and climbed down to fire. This was very hazardous work. Difficulty was experienced in reaching numerous spot fires in almost inaccessible places. Follow-up crews were compelled to make long circuitous routes to reach fire lines on west and south end of fire.

Due to extreme steep slopes, sharp ravines, rock slides and heavy rims, which were covered with moss, plus inaccessible water supply, it was almost impossible to corral the fire. In fact when the fire was corralled it was almost out. Several underground fires burned up again 48 hours after the last hot spot had been considered out. Water was packed in on mules and horses as far as possible, then on by man-pack. Rolling material dropping over rims constituted our worst obstacle. Rolling logs and white-hot rocks rolling down steep slopes and over rims kept men continuously on the hump putting out new fires.

Elapsed time due to steepness and rims made it impossible to reach spot fires in time to keep them from spreading. It was very dangerous to send men down over a rim to reach a spot due to the fact that all avenues of escape might have been cut off at any minute. In mopping up it was necessary to build rock walls below spot fires to stop roll, then watch them until they burned out, as many of them were in pockets which a man could not reach with back-pack and water. Two old sheep bedgrounds had to be spaded up and watered down a spadeful at a time, which extended our mop-up time far beyond our expectations.

Crews were divided into 12-hour shifts and men kept on fire line a

few hundred feet apart night and day as it was impossible to move them to or from fire after dark. Watering and feeding these men was done by back-pack during daylight hours.

This fire emphasized the necessity of mounted fire fighters. If we could have procured saddle animals on which to transport the first crew of five men the fire could have been easily reached and stopped before it began to crown and spread. We should exert every possible means to obtain local mounted men for initial action on fires so located.

As this was a lightning fire, nothing new was learned about prevention.

We learned that one mounted man is worth from 10 to 12 men on foot. Also to get pack animals on the fire as quickly as possible to transport tools, supplies and water. (Use of horses is a lesson which could well be learned in a lot of places other than on the grass-covered steeps of the Wallowa.—Ed.)

We should place radios and operators at strategic points as quickly as possible, supplying them with necessary messengers to relay information to and from fireline. (Another lesson not limited in application to the Wallowa.—Ed.)—W. G. Miller, *district ranger*.

